REMARKS

By the above amendment, claims 1 - 23 have been canceled without prejudice or disclaimer of the subject matter thereof and new claims 24 - 35 have been added.

New claim 24 recites the following features:

(a) A plasma processing apparatus for processing a sample disposed inside of a vacuum chamber using a plasma generated therein comprising:

(b) a sample stage disposed inside of the vacuum chamber on which the sample is located;

(c) a plate disposed at an upper side portion of the sample stage parallelly opposing thereto inside of the vacuum chamber, wherein the plate faces to the plasma generated inside the space of the vacuum chamber between the plate and the sample stage and electric power is supplied for generating the plasma;

(d) a member disposed at an upper side portion of the plate and on the plasma facing side of which the plate is disposed;

(e) an optical transmitter mounted with respect to the member disposed at the upper side portion of the plate which is disposed inside the vacuum chamber so that an end face of the optical transmitter is almost in contact with or spaced apart from the back of the plate and an opening of a through-hole in the plate having a smaller diameter than a diameter of the optical transmitter which receives light from the vacuum chamber via the through-hole; and

(f) a holder disposed at the upper side portion of the plate which holds the optical transmitter with respect to the member.

New independent claim 30 recites similar features.

Applicants submit that at least the features (c) "plate", (d) "member", (e) "optical transmitter", and (f) "holder" enable the function and effect of the present invention as described in the present specification that since the optical transmitter disposed above the plate supplied with the electric power and facing the plasma at the back of the through-hole in the plate is mounted to the vacuum chamber, the optical transmitter is held accurately to the specimen below even when the plate is displaced by the fluctuation of the temperature, and the effect of the plasma given on the optical transmitter by way of the through-hole can be suppressed to conduct stable plasma processing for a long time. Applicants submit that such features which are recited in the independent and dependent claims are not disclosed or taught in the cited art as will become from the following discussion.

The rejection of claims 1 - 23 under 35 USC 103(a) as being unpatentable over Moslehi (US 5,846,883) in view of Grimbergen et al (US 6,390,019) is considered to be obviated by the cancellation of claims 1 - 23 and the presentation of new claims 24 - 33. Insofar as such rejections may be considered applicable to the new claims, such rejections are traversed and reconsideration and withdrawal of the rejections are respectfully requested.

As to the requirements to support a rejection under 35 USC 103, reference is made to the decision of In re Fine, 5 USPQ 2d 1596 (Fed. Cir. 1988), wherein the court pointed out that the PTO has the burden under '103 to establish a prima facie case of obviousness and can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. As noted by the court, whether a particular combination might be "obvious to try" is not a legitimate test of patentability and obviousness cannot be

established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. As further noted by the court, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

Furthermore, such requirements have been clarified in the decision of In re Lee, 61 USPQ 2d 1430 (Fed. Cir. 2002) wherein the court in reversing an obviousness rejection indicated that deficiencies of the cited references cannot be remedied with conclusions about what is "basic knowledge" or "common knowledge". The court pointed out:

> The Examiner's conclusory statements that "the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software" and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial" do not adequately address the issue of motivation to combine. This factual question of motivation is immaterial to patentability, and could not be resolved on subjected belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher." ... Thus, the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion. (emphasis added)

Irrespective of the Examiner's contentions concerning the disclosure of Moslehi, this patent provides a construction where the optical transmitter or plug 110 is disposed in the through-hole at the center of the plate so as to fill the hole (see, Fig. 1, for example), and the plasma density below the through-hole at the center of the plate results in a large difference relative to the other portions to bring about a problem that the processing rate in the central portion of the specimen greatly differs

from the processing rate in other portions, making the processing not uniform. Further, a gap is inevitably present between the optical transmitter and the through-hole in which the optical transmitter is disposed due to tolerance or the like, and abnormal discharge is generated in the space where the gap faces the plasma. Particularly, in a construction, as in the present invention, where the power is applied to the plasma-facing plate for forming the plasma, the abnormal discharge tends to be generated. Generation of the abnormal discharge makes the plasma processing not uniform, which further leads to damages of the plate or the optical transmitter.

In view of the above, the factors (d) and (e) are provided in the present invention. That is, the optical transmitter is disposed at the back of the plasma-facing plate and at the back of the opening of the through-hole of the plate having a smaller diameter than a diameter of the optical transmitter, wherein the light in the processing chamber passing through the through-hole is received by the optical transmitter, thereby suppressing undesired effects by the abnormal discharge in view of the arrangement of the optical transmitter.

Even when the optical transmitter is disposed as described above, the optical transmitter faces the plasma by way of the plate applied with the power and the through-hole and, in a case where a large space is formed between the plate and the optical transmitter, abnormal discharge may possibly be generated also in this space. In order to suppress the drawback, the optical transmitter is constituted as in the factor (e) described above in the present invention. On the other hand, for such abnormal discharge, it may also be considered that the optical transmitter and the member (plate) formed with the through-hole are bonded or in close contact to eliminate the gap thereby suppressing the abnormal discharge. However, the

arrangement of the optical transmitter by bonding or in close contact with the back of the plate result in the problem by the following reason.

That is, the plate which is supplied with the power for generating the plasma and heated to increase temperature by being in contact with the plasma (constituent factor (c)) is deformed in view of the shape by the heat. Then, the optical transmitter connected or bonded to such a plate undergoes a force to displace the same by the thermal deformation of the plate. Particularly, in a case where the optical transmitter is held to the vacuum vessel as in the cited document or in the present invention, since it is difficult that the optical transmitter displaces together with the plate, a large force exerts between both of them to possibly damage one or both of them. On the other hand, in a case where the plate and the optical transmitter are greatly spaced apart from each other, this results in a problem that the plasma or the gas in the processing chamber intrudes into the space between them to cause abnormal discharge. In view of the above, the optical transmitter is arranged as in the factor (e) in the present invention, intending to suppress the occurrence of the abnormal discharge at the back of (above) the plate.

Accordingly, the present invention can provide the function and the effect as described in the specification capable of stable plasma processing for a long period of time and applicants submit that all claims patentably distinguish over Moslehi in the sense of 35 USC 103 and should be considered allowable thereover.

Applicants further note that irrespective of the examiner's contention in Moslehi, both of the plasma-facing plate and the member thereover to which the plate is joined by bonding or sealing are made of insulators, so that the electric power is not supplied to thereto. Further, the optical transmitter or plug in Moslehi is disposed in the hole penetrating the central portion of the plate, the intermediate

insulation member thereover and in the upper portion of the vacuum container so as to fill them. Particularly, the optical transmitter is fitted and disposed in the hole at the center of the plate as shown in Figs. 1 and 11. The Moslehi apparatus results in the problem that the plasma density and the processing rate are greatly different between the portion below the through-hole at the center of the plate and the periphery thereof, thereby making the processing not uniform. Further, it also results in a problem that the plate and the optical transmitter are damaged by the occurrence of the abnormal discharge and the thermal deformation. Thus, it is apparent that Moslehi differs from the claimed features as recited in the claims of this application in the sense of 35 USC 103 and all claims should be considered allowable thereover.

As recognized by the Examiner, Moslehi does not disclose that the light from the processing chamber, for the purpose of reaching the sensor at the back of the optical transmitter, goes through at least one through-hole, and as pointed out above, Moslehi also fails to disclose other features of the present invention. Accordingly, the Examiner cites Grimbergen et al in order to overcome this recognized deficiency of Moslehi.

However, in the processing monitoring system disclosed in Grimbergen, et al, as disclosed in Figs, 1, 4b, 7, etc., the optical transmitter 135, which is a transparent plate, is disposed in close contact with the member 140 formed with the through-hole 145. In view of the above, the technique disclosed in Grimbergen, et al. is different from the construction of the present invention. Further, Grimbergen, et al. disclose a structure in Fig. 3a that the processing monitoring system has a transparent plate 135 disposed so as to be spaced apart above the member 140 formed with the through-hole, through which light from the inside of the processing chamber passes.

As described in the specification of Grimbergen, et al. (col. 9, lines 22 to 26), the transparent plate is disposed with a slant in order to suppress the undesired effect of the light reflected at the transparent plate on the monitoring system. In order to ensure a margin capable of slanting the plate member at an angle, a space is provided relative to the member 140. Further, with respect to Fig. 7, the transparent plate 135 is held so as to be connected with the plasma-facing member. With such constructions, a force tending to deform the transparent plate is exerted by the thermal deformation of the plasma-facing member. Also in this point, the construction is different from that of the present invention.

Applicants submit that both Grimbergen, et al, and Moslehi neither disclose nor even suggest undesired effects caused by abnormal discharge on the optical transmitter and undesired effects due to the thermal deformation of the plasma facing member on the optical transmitter, which are the subjects to be solved by the present invention. Further, Moslehi and Grimbergen, et al neither disclose nor suggest at all for the subjects, functions and effects, and the construction inherent to the present invention for attaining such functions and effects.

As described above, the construction of Grimbergen, et al. is different from the recited features of the present invention: that "an end face of the optical transmitter is almost in contact with or spaced apart from the plate at an opening of a through-hole in the plate having a smaller diameter than a diameter of the optical transmitter which receives light from the vacuum chamber via the through-hole" nor does the proposed construction provide for electric power being supplied to the plate in the manner recited. Accordingly, all claims patentably distinguish over the cited art in the sense of 35 USC 103 and should be considered allowable at this time.

In view of the above amendments and remarks, applicants submit that all claims present in this application patentably distinguish over the cited art and should now be in condition for allowance. Accordingly, issuance of an action of favorable nature is courteously solicited.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 520.39649CX3), and please credit any excess fees to such deposit account.

Respectfully submitted,

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